



PA-0030-498002

Seat No. _____

**B. Sc. / M. Sc. (Applied Physics) (Sem. VIII)
(CBCS) Examination**

March / April - 2020

**Nanomaterials I - Synthesis and Types : Paper - VI
(New Course) (Core)**

Faculty Code : 0030

Subject Code : 498002

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

1 Attempt Any Seven short questions : (Two marks each) 14

- (1) What are nanocomposites?
- (2) What is meant by homo-epitaxial and hetero-epitaxial film growth?
- (3) Define nanoscience and nanotechnology.
- (4) Define micro and mesoporous materials.
- (5) What are different core-shell nanostructures?
- (6) Draw the diagrams for three basic nucleation modes in film growth.
- (7) Draw a well labelled diagram of AFM.
- (8) Define Molecular nanomachines.
- (9) Draw a Schematic diagram of Sol-Gel method for nanomaterial synthesis.
- (10) What are carbon nanotubes?

2 (A) Write answers of Any Two : 10

- (1) Describe in brief the template base synthesis of zero dimensional nano structures.
- (2) Describe various heterogeneous nucleation methods for synthesis of different nanoparticles.
- (3) Describe the synthesis of Au and Ag nanoparticles.
- (4) Describe the synthesis of ZnO nanoparticles using sol-gel method.

- (B) Write answers of Any **One** : 4
- (1) Discuss the synthesis and applications of Carbon fullerenes.
 - (2) Describe the synthesis of CdE (E=S, Se, Te) nanoparticles.
- 3** (A) Write answers of Any **Two** : **10**
- (1) Describe chemical vapour deposition (CVD) method of film growth.
 - (2) Explain the vapour liquid solid growth of Si nanowire using Au catalyst.
 - (3) Describe the template-Based synthesis of 1-D nanostructures what are the requirement of template materials?
 - (4) Write a note on Electrospinning method for the growth of nanofibers.
- (B) Write answers of Any **One** : 4
- (1) Describe physical vapour deposition (PVD) method of film growth.
 - (2) Describe the lithography technique for growth of 1-D nanostructures.
- 4** (A) Write answers of Any **Two** : **10**
- (1) Explain the D.C. and RF sputtering method for the growth of nanostructured films.
 - (2) Describe the Sol-gel processing of nanostructured film
 - (3) What is ALD? What are the advantages ALD over PLD?
 - (4) Write a note on superlattices and self-assembly.

- (B) Write answers of Any **One** : 4
- (1) Describe the homogeneous nucleation for the growth of thin film.
 - (2) Explain electrochemical deposition of nanomaterials.
- 5 (A) Write answers of Any **Two** : 10
- (1) Discuss the synthesis and applications of Core-shell nanostructures.
 - (2) Describe various Nano ceramics and their applications.
 - (3) Discuss the synthesis and applications of Carbon nanotubes
 - (4) Describe various nanomaterials for consumer applications.
- (B) Write answers of Any **One** : 4
- (1) What are the micro and mesoporous materials? Explain using suitable examples.
 - (2) What are advanced nanocomposites? Give their uses.
-